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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/701,412 | 10/31/2003 | Debra R. Reinhart | KSC-12246-2 | 5887 |

25190 7590 07/07/2005

NASA JOHN F. KENNEDY SPACE CENTER
MAIL CODE: CC-A/OFFICE OF CHIEF COUNSEL
ATTN: PATENT COUNSEL
KENNEDY SPACE CENTER, FL 32899

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| EXAMINER |
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MITCHELL, KATHERINE W

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| ART UNIT | PAPER NUMBER |
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3677

DATE MAILED: 07/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-----------------------|-----------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/701,412 | REINHART ET AL. | |
| | Examiner | Art Unit | |
| | Katherine W. Mitchell | 3677 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 May 2005.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 27-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 27-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant ~~may not request~~ that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is ~~required~~ if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. <u>with this action</u> . |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____. | 6) <input type="checkbox"/> Other: _____. |

5-0-0

DETAILED ACTION

Specification

1. The amendment filed 5/13/2005 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: a water in oil emulsion is not taught. Applicant argues that it is an obvious typing error and that one of ordinary skill in the art would know it must be water-in-oil, not oil-in-water as originally filed. However, numerous references, provided with this action, teach oil-in-water emulsions of zero-valent iron for DNAPL remediation.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 27-38 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Specifically, applicant has argued in his remarks that oil-in-water emulsions will not work:

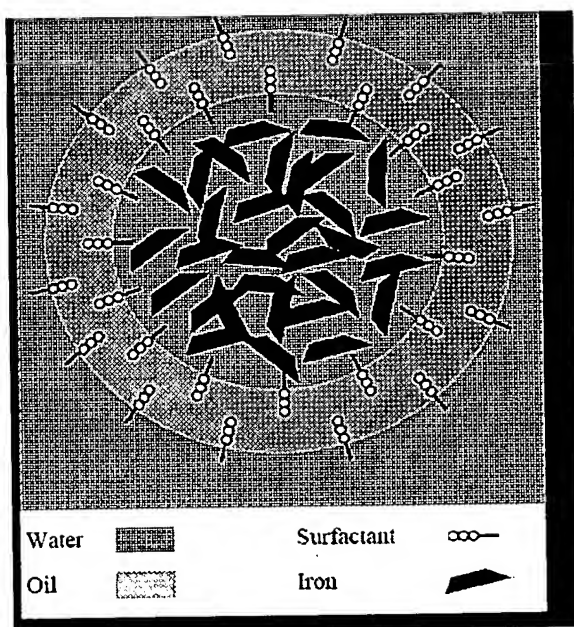
The specification was amended to include a water-in-oil emulsion. As indicated on page

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5, lines 18-21, the emulsion is hydrophobic, which allows the DNAPL source, for example TCE, to enter through an oil membrane where it can diffuse to the zero-valent metal particle and undergo degradation". This indicates that the emulsion must be a water-in-oil emulsion. The recitation of an oil-in-water emulsion on page 8, line 4 was inadvertent and should read as being a "water-in-oil emulsion" as amended herein. Furthermore, "an aqueous slurry of reactive iron particles would be rejected by the hydrophobic DNAPL pool".

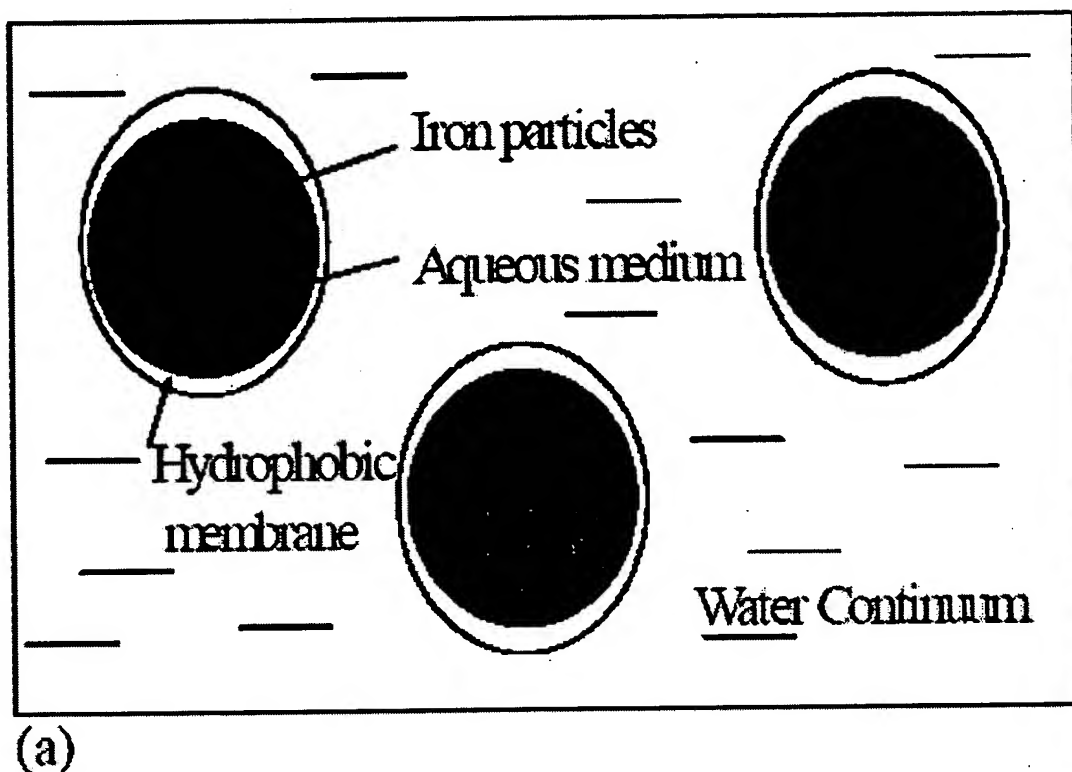
With this argument, examiner no longer knows how the invention works. The claims are to an emulsion, which applicant now argues MUST be a water in oil emulsion.

Examiner believed that the emulsion micelle could be represented as shown in the Figure on page 7 of O'Hara et al., EMULSIFIED ZERO-VALENT IRON TREATMENT OF CHLORINATED SOLVENT DNAPL SOURCE AREAS downloaded from http://rtdf.org/PUBLIC/permbarr/minutes/101603/pdf/n_ohara.pdf, and copied below:



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and that the overall system was as shown on page 2, Fig a of Geiger et al., The in-Situ Treatment of DNAPL with Zero Valent Iron Emulsions, downloaded from www.people.cecs.ucf.edu/reinhart/Emulsion.pdf, and copied below :



Both these are clearly oil in water emulsions. This seems to examiner supported by at least the following from the specification:

(21) *The present invention overcomes the previous understanding that the incorporation of zero-valent metal particles, such as iron particles, into a liquid membrane micelle would lead to passivation of the particle surface with regard to its ability to dehalogenate compounds. Kinetic studies have shown that the dehalogenation rates of a zero-valent metal emulsions are very high, and in fact, are much higher than free zero-valent metal particles with regard to the dehalogenation pools of pure DNAPL.*

(22) *A beneficial feature of the zero-valent metal emulsion is that no halogen-containing atoms exit from the micelle during remediation. The zero-valent metal emulsion draws free DNAPL into the inside of the micelle where the degradation reaction takes place. For example, during the*

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remediation of TCE, no chlorinated daughter-products have been found to exit from the micelle. The only degradation by-products that have been detected are hydrocarbons, such as ethene, which are easily degraded by biological action and are non-toxic.

(23) Additionally, the zero-valent metal emulsion is simple to prepare and is relatively inexpensive. The zero-valent emulsion is made from environmentally compatible components. The preferred surfactant is of the food-grade quality, and the liquid membrane preferably consists of a vegetable oil which is biodegradable. Since the zero-valent metal emulsion can be injected into the DNAPL zone by using simple push wells and incur no continuing operating costs, use of an zero-valent emulsion possesses an economic advantage over a long-term pump and treat methodology. Because of the thousands of DNAPL sites in the United States alone, use of this technique would generate millions of dollars in economic improvement within the remediation community. ...

(31) In use, DNAPL sources diffuse through the oil membrane of the zero-valent metal emulsion whereupon they reach the surface of the zero-valent metal particles where dehalogenation takes place. A hydrocarbon reaction by-product of the dehalogenation reaction, for example ethene, diffuses out of the emulsion micelle and vents to the aquifer.

Furthermore, the parent application, USP 6664298, discloses that an oil-in-water emulsion is used. This has been issued and applicant has not filed any request for correction that examiner is aware of.

Examiner does not see how an oil-in-water emulsion is inherently impossible as argued by applicant. Further, examiner does not see how the present invention with the newly-disclosed "water-in-oil" emulsion would work, as it would not have the oil membrane described as required. Thus no emulsion is described in the specification that would enable the claims to work, since a water-in-oil emulsion will not have the required oil membrane of the zero valent metal emulsion. There is no possible reference that will teach an emulsion that does not contradict at least one part of the specification— either it will be an oil-in-water emulsion with an oil membrane (thus contradicting a required water in oil emulsion) OR it will be a water-in-oil emulsion and

will not have an oil membrane surrounding the zero valent iron (this membrane is described as a required component for the invention to work).

Double Patenting

4. In view of the cancellation of claim 1, the double patenting rejection is withdrawn.

Allowable Subject Matter

5. Examiner is withholding an opinion on the allowability of the claims based on art until the 112 1st paragraph rejection is resolved. Therefore, all prior art rejections under U.S.C. 102 and 103 are withdrawn, since they would require an oil in water emulsion to work and the record now states that applicants' invention requires a water in oil emulsion to work, but is not enabled as a water in oil emulsion.

Response to Arguments

6. Applicant's arguments filed 5/13/2005, with respect to 102(f), applicant is not the inventor, have been fully considered and are persuasive in view of the declarations filed. The rejection is withdrawn.
7. Applicant's arguments filed 5/13/2005, with respect to Chang are persuasive in view of the amendment that the zero valent metal particles are part of the emulsion micelle. Examiner agrees that Chang does not read on the pending claims. The rejection is withdrawn
8. Applicant's arguments filed 5/13/2005, with respect to the DNAPLS proposal #990094" as non-enabling have been fully considered but they are not persuasive. Applicant's specification has to enable the claims. The prior art needs only to anticipate or make obvious every element of the claim. Applicant claims:

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12 (original). A method for remediating a halogenated solvent comprising:

a) providing a zero-valent emulsion comprising a plurality of zero-valent metal particles, a surfactant, an oil and water; and

b) adding said zero-valent metal emulsion to said halogenated solvent, whereby said halogenated solvent is dehalogenated.

Applicant claimed no special steps of making a particular emulsion, only that it is "provided" and "added". The reference specifically teaches "a surfactant stabilized oil in water emulsion with nanoscale iron particles contained within the emulsion particles" and that the DNAPLS such as TCE diffuse through the oil membrane of the emulsion particles and reach the iron particle where dehalogenation takes place. Every element is taught and examiner believes the DNAPLS proposal #990094 does enable one of ordinary skill in the art to make and use the invention, albeit perhaps not optimally.

9. Regarding Dr. Majors listed as an author of --The DNAPLS Paper--, the fact that Dr. Majors has signed a declaration that he was not an inventor or the claimed invention does not affect the non-patent literature paper cited. --The DNAPLS Paper-- is still considered to be authored by, not invented by, others, as the standard is "known or used by others", not invented by others. Examiner notes that the paper is used under 102(a), not 102(b) and thus is not a statutory bar.

10. The Borden reference was used as a secondary reference only - it does not need to teach all the elements. The fact that it teaches additional or different steps does not matter as long as it shows that a particular step or component was known and would be obvious to combine with the base reference.

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11. However, examiner is withdrawing all rejections based on art pending resolution of the 112 1st paragraph rejection. Until examiner is satisfied the specification enables the claims, it is impossible to accurately evaluate the claims with respect to prior art teachings.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

14. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine W. Mitchell whose telephone number is 571-272-7069. The examiner can normally be reached on Mon - Thurs 10 AM - 8 PM.

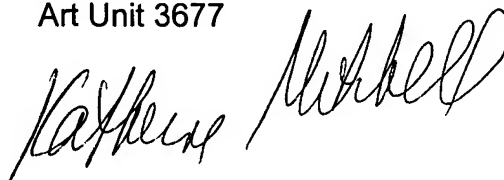
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, J. J. Swann can be reached on 571-272-7075. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

16. Non-patent literature documents cited on the 892 attached are NOT being provided, as they were provided with 10/701410 and applicant indicated in phone interview that he would obtain these if examiner provided the web links, which examiner provided via email (attached to interview summary with this action)

17. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Katherine W Mitchell
Examiner
Art Unit 3677

A handwritten signature in black ink, appearing to read 'Katherine W Mitchell', written in a cursive style.

Kwm
7/1/2005